



Space Launch System

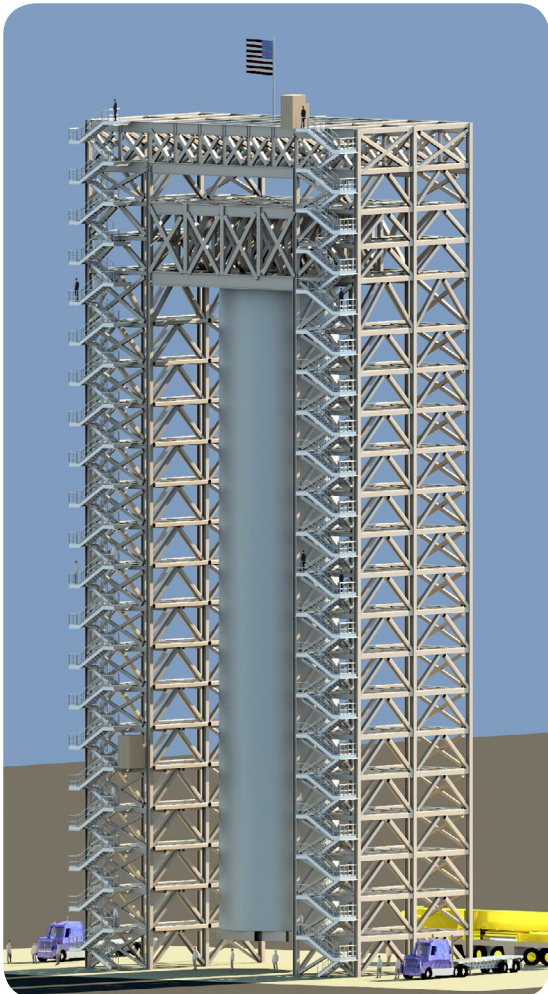
Highlights

May 2014



Breaking Ground: Making History

SLS Structural Test Stands to be Built at Marshall Space Flight Center

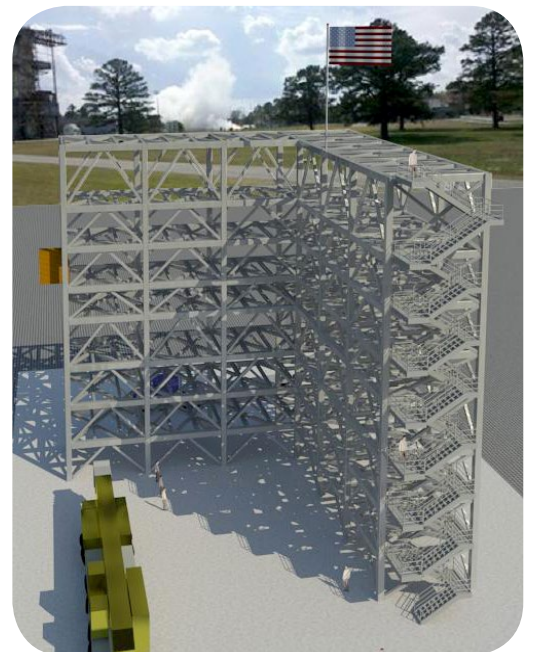


SLS will have the largest cryogenic fuel tanks ever used on a rocket. Stands to test the tanks and other hardware to ensure that these huge structures can withstand the incredible stresses of launch will be built at NASA's Marshall Space Flight Center.

NASA is contracting for the construction of the test stands through the U.S. Army Corps of Engineers, which has awarded a \$45.3 million contract to Brasfield & Gorrie of Birmingham, Alabama. For the full story, click [here](#).

- ◀ Artist concept of Test Stand 4693 to be constructed at the Marshall Center. The 215-foot stand will be used for structural loads testing on the liquid hydrogen tank for the SLS core stage. (NASA/MSFC)

Artist concept of Test Stand 4697 at the Marshall Center. The 692-ton steel structure, about nine stories high, or 85 feet, will be used for structural loads testing on the SLS core stage liquid oxygen tank and forward skirt. (NASA/MSFC) ▶

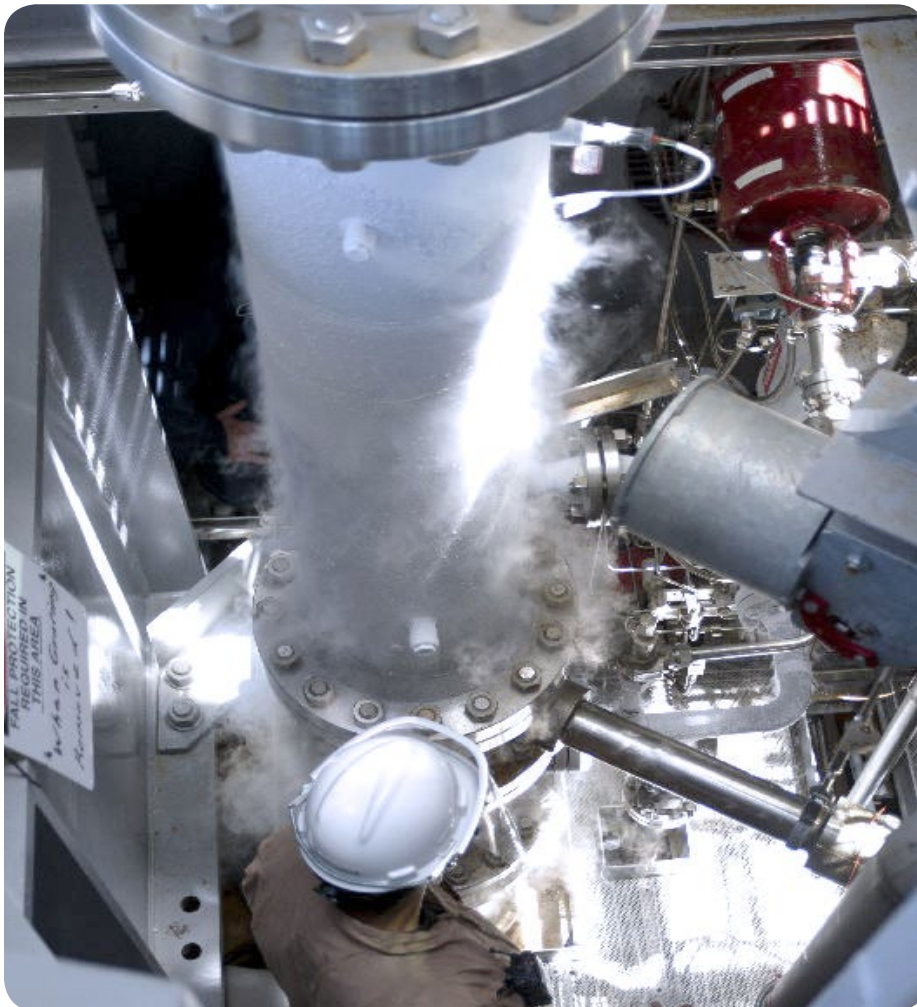


Hardware Arrives at Cape Ahead of Orion's First Flight Test

The port booster, stage adapter and the second stage of the Delta IV rocket—which will take NASA's Orion spacecraft to space for its first flight test—recently arrived by barge in Cape Canaveral, Florida, from United Launch Alliance in Decatur, Alabama. The adapter, designed and built at NASA's Marshall Space Flight Center, will connect Orion to the Delta IV rocket. United Launch Alliance is constructing the Delta IV for that maiden flight. The hardware is now housed at the Horizontal Integration Facility at Space Launch Complex 37 on Cape Canaveral Air Force Station. The pieces are being processed and checked out prior to being moved to the nearby launch pad. (NASA/KSC)



NASA Achieves Key Milestone Leading to RS-25 Engine Testing



A member of the A-1 Test Stand operations team examines the progress of a cold-shock test on the new A-1 structural piping system May 1. The test marked a milestone in preparing the stand to test the RS-25 rocket engines that will power the core stage of the SLS. Delivery and installation of the first RS-25 engine is planned for early summer. For the full story, click [here](#). (NASA/Stennis)

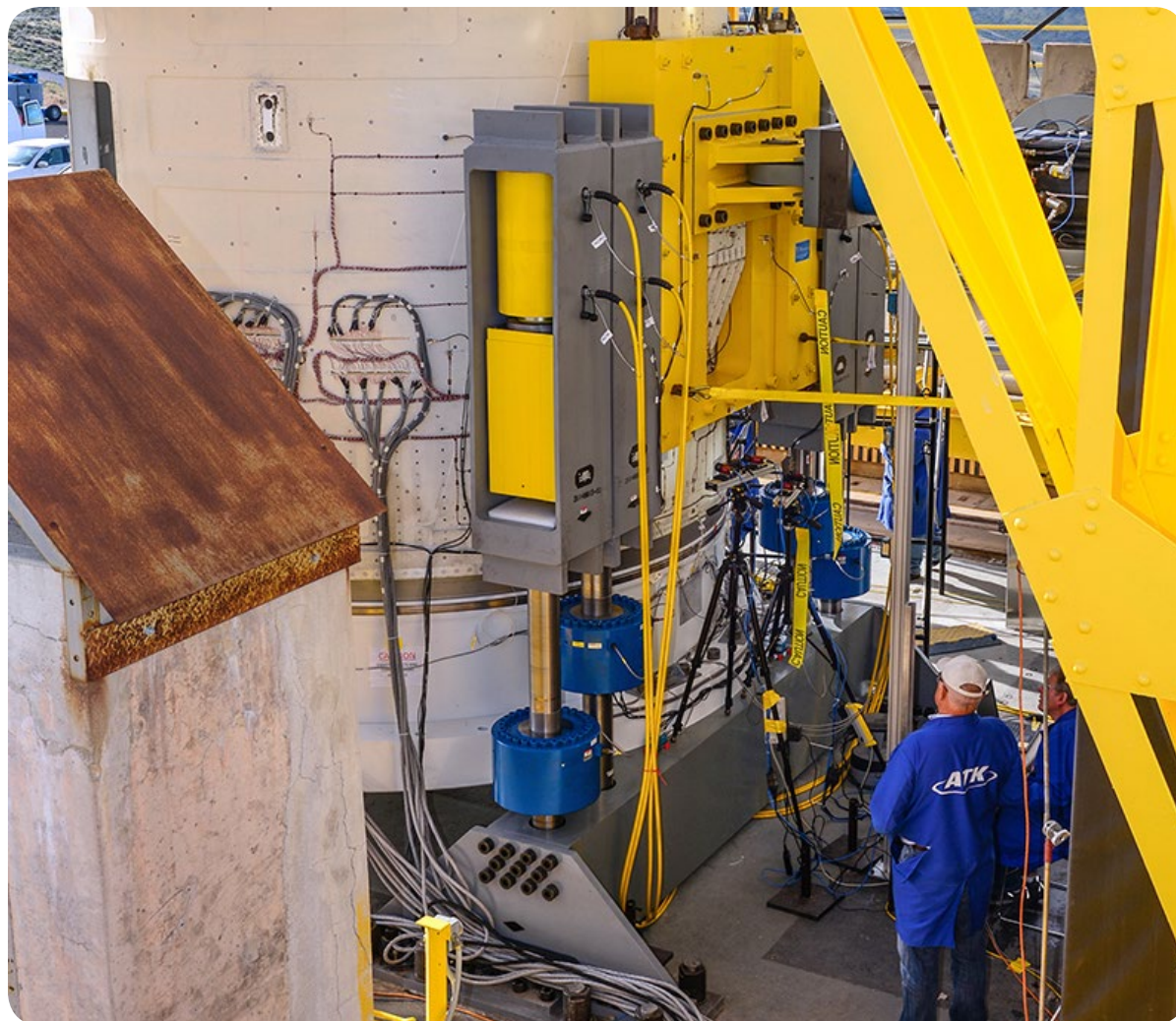
**I am
building
SLS**

Dee VanCleave
Structural Test Engineer



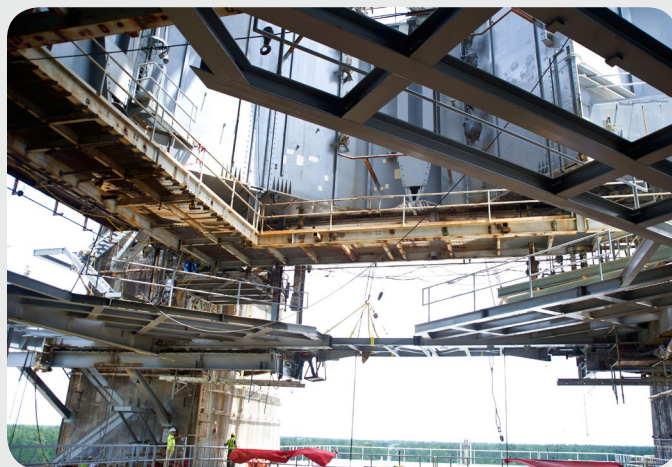
To find out more about the people who are building SLS, click [here](#).

Engineers Test NASA's SLS Booster Forward Skirt to the Limits



At left, NASA and ATK engineers complete structural loads testing on the SLS booster forward skirt at ATK's facility in Promontory, Utah. Structural loads tests are performed to ensure each piece of hardware can endure loads without any adverse effects to the vehicle, or most importantly, to the crew. For the forward skirt test, engineers used increments of force—about 200,000 pounds per minute—to prove the design capabilities meet the strength requirements, with sufficient margin. The structure was also subjected to a combination of axial and lateral loads, which are critical at liftoff. For the full story, and video, click [here](#). (ATK)

NASA Moving Forward on Test Stand Upgrades for SLS Core Stage Testing



"Before-and-after" photos show the progress of renovation work on the B-2 Test Stand at Stennis Space Center as NASA prepares for testing the SLS core stage in 2016. For the full story, click [here](#). (NASA/Stennis)

Spaceflight Partners: PEM Technologies

EDITOR'S NOTE: Every month, SLS Highlights turns the spotlight on one of the industry partners helping to create the largest rocket ever built for human space exploration. In this issue, we profile PEM Technologies, LLC of Natrona Heights, Pennsylvania.



From left, PEM employees Tom Sherer, Tom Ravotti and Don Risko set up to machine an Aerojet Rocketdyne spherical ball valve sealing surface. (PEM)

PEM Technologies, LLC has been working with Aerojet Rocketdyne since 2012 to develop a final machining and finishing process for ball valve components of the main fuel flow control for the J-2X engine.

Formed in 2010 to provide advanced electrochemical machining technology with facilities in Natrona Heights, Pennsylvania, PEM Technologies, LLC is co-located with JV Manufacturing where together the companies develop, demonstrate, manufacture and support PEM machining of high accuracy, fine surface finish components.

PEM, which stands for Precision Electrolytic Machining, is a process of full-form machining of metal components by dislodging surface atoms with a preformed metal electrode that never touches the

workpiece. A solution of deionized water and salt provide a conductive path between the electrode and workpiece while a precise DC voltage pulse causes a current that result in precise metal removal without any degradation to the surface.

“The most interesting and challenging aspect about working with this technology is finding, developing and implementing new applications for the PEM process, such as components for artificial heart valves, fuel cells, diesel engine fuel systems and jet engines,” said Don Risko, Vice President of PEM Technologies. “The opportunity to support America’s space program by developing a cost effective, faster manufacturing solution that reduces a 19-step process to a one-step PEM process, is an exciting experience for PEM Technology.”

SLS On the Road...



An inflatable SLS stands tall May 7 at the Capitol in Baton Rouge for NASA Louisiana Aerospace Day 2014. (NASA/MSFC)



Comic fans of all ages visit the SLS and Orion spacecraft booth at Comicpalooza, held May 23-26 in Houston. (NASA/Orion)



Keith Hefner, SLS program associate manager, speaks to attendees May 7 at the SpaceOps 2014 conference in Pasadena, California. (NASA/MSFC)



Spectators at NASA's Student Launch challenge sign the "I'm On Board with SLS and Orion" poster May 17 at the Bonneville Salt Flats in Tooele County, Utah. (NASA/MSFC)

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SLS on Deck:

- Exploration Systems Development (ESD) Update Day
- NASA Day on the Square
- RS-25 Installation at Stennis Test Stand